Communications

Basic Communications Guidelines

Within emergency communications you will have two different kinds of messages. The first is known as formal traffic. This is generally used in passing messages on behalf of a served agency, especially any instructions or requests for supplies or equipment. Under those conditions you pass traffic *exactly* as written. You change nothing. In some instances you will not understand what the message means. That is fine. Your job is to get the message to the destination as quickly as possible, not to understand it.

When you receive a message from a served agency, read it. If there is any part you cannot read, ask for clarification before accepting the message. You can't accurately transcribe what you cannot read.

When you transcribe a message from a served agency, *make no changes!* It does not matter if you do not understand the technical meaning. It *does* matter that you pass traffic exactly as written.

Let's revisit the last sentence.

PASS TRAFFIC EXACTLY AS WRITTEN!

- If you are the author, make your corrections before you are ready to send.
- If *anyone else* initiated the message, *make no changes!*

The second type of communications is where you originate the message, it is not written, and a written response is not required. This is commonly known as informal traffic. In that situation you control what the text of the message will be. Therefore phrasing is up to you.

Plan your communications at least as well as you plan what you say when you know you will be quoted. Whenever reasonable, write down what you will say before you say it.

"A loud voice cannot compete with a clear voice, even if it's a whisper" - B.N. Kaufman

In emergency communications it is important to say as little as possible, yet convey all of the meaning. How can we do this?

Brevity and Clarity

The standing "rule of thumb" in composing messages is: if you can leave a word out without changing the meaning, leave it out. If a description of an item will not add to the understanding of the subject of the message, leave it out.

Another item to remember: *do not* use contractions within your messages. Words like "don't" and "isn't" are far too easy to confuse. Add to that the stress and confusion during an emergency and they *will* create problems.

Do Not Editorialize

Literally hours can be lost by people inserting their opinion on unrelated subjects. What someone thinks about a ball game or the weather is irrelevant unless weather or the ball game is the subject being discussed. And even then, the radio operator's opinions still may not matter.

Listen

The first requirement for communications is the ability to listen. But, you say, I can tell someone what is required without listening. Not really.

Communications is the *two way* exchange of thoughts, ideas, or information. ***Two way***. That requires listening. An old timer once told me, "A person has two ears and one mouth. Therefore he should listen twice as much as he talks." Makes sense.

Use Standard Phonetics

While it may take little effort to speak into a microphone and listen, it does take some care to quickly and accurately convey exact information. Speak distinctly at all times. If the information is to be written, pace your speech accordingly.

For critical information, or under noisy conditions, spell words with standard phonetics. Unfortunately there are two common systems of "standard" phonetics: the phonetic alphabet used by most police departments, and the ITU phonetic alphabet used by just about everyone else, including all NATO military forces, federal government agencies, all pilots, and Amateur Radio operators. ITU phonetics were chosen by the International Telecommunications Union so that each word sounds completely different from all other words regardless of language. A list of ITU phonetics is available in numerous publications.

A – alfa (AL-fa)	B - bravo (BRAH-voh)
C – charlie (CHAR-lee)	D - delta (DELL-tah)
E – echo (ECK-oh)	F - foxtrot (FOKS-trot)
G – golf (GOLF)	H - hotel (HOH-tell)
I – india (IN-dee-ah)	J - juliet (JU-lee-ett)
K – kilo (KEY-loh)	L - lima (LEE-mah)
M – mike (MIKE)	N – november (no-VEM-ber)
O – oscar (OSS-cah)	P - papa (PAH-PAH)
Q – quebec (kay-BECK)	R - romeo (ROW-me-oh)
S – sierra (SEE-air-rah)	T - tango (TANG-go)
U – uniform (YOU-ni-form)	V - victor (VIK-tah)
W – whiskey (WISS-key)	X - x-ray (ECKS-ray)
Y – yankee (YANG-key)	Z - zulu (ZOO-loo)

If you are working specifically for an agency that uses their own system, obtain their list and use it. Otherwise, use the ITU phonetic alphabet.

Numbers

Numbers are pronounced as individual digits. The number 60 is pronounced six zero, not sixty. The number 509 is pronounced five zero nine, not five hundred nine, and not five oh nine.

Again, some agencies may have their own way of doing things. If you are working specifically for an agency that uses a different method it is perfectly correct to do it their way, but the digit by digit method is the one safe, sure way to ensure any number is clearly understood.

Formal Written Traffic

Any formal traffic should be written out and signed by the author, but this isn't always practical in an emergency. You may have to be the one to write down the message. If you do write the message, try to have the "author" sign it, or at the very least read and approve it (make a note of the circumstances if necessary).

These precautions are especially important when sending a message requesting any sort of supplies, equipment, support, personnel, etc. If you are originating such a message, be sure you have asked all questions necessary to have obtained the following:

1. Who is requesting and from whom?
   - What is the requestor's full name, title, agency, and location?
   - What is the recipient's full name, title, agency, and location?

2. What are they requesting and how many do they want/need?
   - Is it a list or single item?
     - If it's a list, do all items come from the same place?
       - If multiple sources, send as multiple messages.
   - Is the subject the transportation of an item, or the acquisition of that item, or both?

3. Where will it come from (not always the same as the location of the person receiving the request)?

4. Where will it go (not always the same as the location of the person requesting the items)?

5. When is it needed?
   - Time/date as applicable

Communications is:

- A two way exchange of ideas or information

- The fewest words that completely define the thought

- One complete thought or task at a time

- Sometimes eloquent, but usually not, because it is precise

- Unemotional

Public Service and Emergency Communications

Getting the Message Through - Power Isn't Everything

In any communications systems, to improve communications, the goal is not to raise the signal power but to improve the difference between the signal and the noise levels to achieve reliable communications. Therefore, there are things that can be done to reduce noise. Similarly, there are techniques that can be used to reduce obstacles that are like noise in that they diminish or block successful communications.

Basic Communications Model

Any communications system can be modeled using these conceptual components:
- The message to be sent.
- Encoding the message to a form that can be conveyed over a medium.
- Transmitting the message.
- The medium used for communications.
- Noise in the medium.
- Receiving the message.
- Decoding the message from the medium to a humanly understandable form.
- Recognition of the message by the receiving person.
- Feedback to the originator of the message.

We will use this model to examine ways for improving emergency communications.

Using the Basic Communications Model to Troubleshoot a Breakdown in Emergency Communications

At times, communications between two points can break down, resulting in reduced or nonexistent communications. Whenever there is a breakdown in communications, examine which components are affected, and what can be done to mitigate the problem or workaround the limitation. Similarly, by reviewing each component, small changes can be made to enhance the contribution made by that component.

The Message

A key element in the communications system is the message. A message is used to cause action by the receiver of the message. This leads to some thoughtful questions:
- What kind of action is needed at the receiving end?
- What information is needed for the action to take place?
- Since there is an emergency and this request/information will be competing for attention and response, what additional information is available to justify a higher priority?
- How can the sender tell if the correct action to the message has taken place?

Composing Formal Traffic

In most situations, the radio operator is providing communications on behalf of a served agency. An authorized person on staff with the agency would be originating and receiving these messages. In the middle of an emergency, it is often possible that the staff person will overlook one or more key elements of a message. As communications specialists, we can assist by "coaching" the person through the composition of the message and reviewing the message to see if it has the key elements in a good formal message.

Good formal messages should include:
- Addressee (full name, full title, agency, location, optional telephone number)
- Body of the message
    = What is the situation?
    = Who is the requestor?
    = What is being requested? Is the request for a single item or a list of items? How many are needed or wanted?
    = When is it needed?
    = If known, indicate the sources where the items can be obtained. If it is for a list of items, does it come from a single source? If it comes from multiple sources, a message should be generated to each source.
    = Where should the material or people be sent? Where is the transfer point? Be specific and identify it down to the side of a building, as one can waste a lot of time walking around looking for buildings and walking around a building.
    = What are the available times for arrival?
    = Is the access to the site expected to be clear?
    = Who should the responder locate when he/she arrives?
    = Is there a frequency, telephone number, or other means of contact in the local area? Or when the response is in progress?
    = Who should be notified when the response is under way?
    = Any other considerations?
- Signature (full name of sender, full title, agency, location, optional telephone number)
Note that a handwritten signature is not always essential, but the full name and title are essential parts of the "signature"

In certain situations, the staff person may not be available and in the interest of time, the communicator may need to draft the message on behalf of that person or agency and have it ready for their review and approval before sending the traffic. In these situations, be sure to review the message for these elements before presenting it for approval.

On a large operation there will be a lot of formal message traffic. Most agencies have some form for writing down messages - more and more agencies are adopting the standard ICS General Message Form (ICS form 213). Some agencies call their form a "213" but have modified the standard form. Use whatever form the served agency provides - if that form calls for additional information, fill in the information on the form.

Sometimes it may be important to send out information to the net about radio operations that are not of direct consequence or interest to the served agency, but are important to coordinate and sustain net operations. Examples are establishing new nets, new stations on the nets, and mobilizing fresh operators to relieve existing operators. These messages may appear as informal traffic. The informal traffic should also be reviewed before it is sent to see if it includes the information above. All traffic that involves resources (supplies, equipment, or personnel) should be treated as formal traffic and written down.

Encoding/Decoding – Use Plain Language and ITU Phonetics, No Slang

The first aspect is looking at the encoding/decoding of the message. Clearly, expressing a thought and composing it into a message is a human activity. The choice of available communications media influences the size of the message; however, it is still a human that determines how a message is phrased and what it contains. Therefore, you should observe the choice of words and operational prosigns that you use to carry out the communications.

Use Plain Language

During an emergency, the rule is that you'll be working with people you have not met before. Therefore, to avoid any assumptions about having to know abbreviations, key phrases, jargon, and other information that may be specific to a given agency, use plain language to compose and pass a message. Avoid the use of slang, as the other party may not be from the same background as you and can even misinterpret the slang expression to be translated literally.

Different agencies may have different procedural codes:
- Police department communications procedures used to encourage use of 10 codes - now most departments officially call for plain language, but 10-codes, abbreviations, and jargon are still very common. This usually isn't a problem for communications *within* a single department, but can cause great confusion when personnel from more than one department are involved.
- Fire and ambulance services also used to use 10 codes, but many are moving to plain language now (Just as with Police Departments, you may see a mix of operating styles within an agency).
- The codes used by one department may not be the same as the codes used by another.
- Most public works departments use plain language, but may have codes for some things.
- Different municipalities have different standards.
- Hams sometimes use "Q" signals, sometimes don't.
- Some *REACT* Teams used to use 10 codes, a few may still do, but plain language is *the* standard.

When each group communicates only among themselves, this is not an issue. However, in a mutual aid drill involving a simulated commuter train wreck with eighty casualties, nearly thirty different entities were involved from six municipalities. In the debrief, at

least one significant error was traced to failure to use plain language: a dispatch order wasn't understood and the needed rescue equipment rolled twenty minutes late.

Use standard phonetics, preferably the ITU phonetic alphabet. It is the set of phonetics used internationally in most two-way radio settings. Resist the temptation to use "cute" phonetics such as those often used by Amateur Radio operators for their call signs.

Receiving Techniques

Wherever possible, transfer the message to hardcopy. Whether you copy the message text by hand, have a computer print an incoming packet message, or jot down notes from an informal message, putting the message down on paper helps others read the message – especially if you should walk away from the operating position, take a break, take a nap, or be replaced by a new operator.

Whenever possible, print using large block capital letters. It comes across neater than script, so more people can read it.

Practically speaking, the average person can block print around 15 words per minute.

When copying a radiogram message, get in the habit of copying five words to a line. It does not have to line up into five columns (which is nice, but not a requirement). It is more important to break it up into groups of five words to ease the counting of words.

Whenever possible, use headphones to cut down the impact of nearby noise and to increase privacy of the information.

Sending Techniques

Practice sending at the appropriate rate at which the other operator can copy comfortably. That means you shouldn't ramble off the message text at high speed, but pace yourself to the same speed that the other party is copying (about 15 WPM). That translates to about one word every four seconds. As you speak, imagine that you're writing the word in your mind. After a while, you'll get the hang of talking 15 WPM. If you do this right, you will rarely get a request to repeat a section.

When asking for part or all of the message to be repeated, get into the habit of saying "Say Again" instead of "Repeat." Repeat is used in the military to fire another salvo of artillery. Also, if you're using a VOX or foot switch, there's a greater chance that the receiving party will hear "again" instead of hearing a fraction of the word "...peat".

If you are right-handed, get used to holding and keying the mike with your left hand, to keep your right hand free for writing down the message. Or use a foot switch to free your hands when you key the radio.

Use a boom mike to free your hands and cut down stray background noise.

Equipment Settings

When working with another operator, make an effort to observe the operator, learning the controls that he/she activates to make contact. There may be a time when you have to relieve that operator and the more you know, the faster you'll be able to handle that assignment.

Communications Methods - Using Whatever Mode and Frequency Necessary

The first contribution to the design of an effective emergency communications network is to reduce the number of elements in the communications path. This includes:

- Reducing the number of hops or stations that need to relay the message.

- Reducing the number of radio operators needed to handle the message.

- Reducing the number of people involved in handling the message.

Reducing the number of elements without a substantial drop in quality makes the total system more reliable.

If one particular communications method (equipment, mode, frequency) is not available or usable, we must be prepared to switch to another band or method that is usable.

At times, it may mean using the telephone or a radio system that isn't our own. For example, you might be called upon to be a relief operator for a local government agency radio system. You should make an effort to become familiar with their operating practices, including the sequence of calling/called stations and procedural codes that may be in use. Take some time to familiarize yourself with the phone (PBX) system, nearby fax machines, and e-mail systems that might be present. Even copy machines should be considered communications equipment, as the copies you make communicate with other people.

Remember that you can use government or commercial radios with the permission of the appropriate authority because such systems are covered by station licenses issued to the organization or agency and do not require individual operator licenses. However, unless you hold an Amateur Radio license, you cannot operate Amateur Radio equipment even if it is owned by the agency (such as Amateur Radio equipment installed in some state and local Emergency Operations Centers).

As emergency communicators, our mission and goal is to pass the message accurately, in a timely fashion, and in a usable form to the destination. That means that at times we may have to step aside from our radios and use other prudent methods to get the job done. At times it might be best to hand over the microphone to the person wishing to speak, so he can say the message to the recipient directly – thereby cutting out one delay in the relaying of the message. If we're holding the microphone, we become part of the communications path and can reduce the reliability of the message. This technique of having the person originating the message speak directly over the radio is equally valid with all radio services (including Amateur Radio) but in all cases the radio operator remains responsible for proper operation of the radio.

Even non-electronic signaling methods are forms of emergency communications. If you are directing rescue workers to an unfamiliar scene (such as via a military helicopter), you can instruct a party at the rescue scene to move a police car near a suitable landing site closest to the scene, and have them activate the rooftop flashing lights to guide the incoming helicopter to that location. If you can send messages to both parties to coordinate the hook-up using the visual flashing light, that will better ensure that minimal time is used to locate the rescue and evacuation scene.

In times of communications difficulties, cross-band operation may be necessary. This may include using different modes or even different radio services. Do not hesitate to talk on "your" frequency and listen out of band to the transmissions of another agency. If they have access to a scanner, they likewise can listen to your transmissions and thereby achieve reliable two-way contact even when you do not share a common frequency.

Noise in the Communications Media

Noise in the communications media can take many forms. In radio communications, it can take the form of static, adjacent channel interference, intermodulation, and other similar interference.

In the audio portion, conversations by nearby bystanders can interfere with your ability to hear the radio.

Poor lighting or other distractions are another form of "noise."

Codes used to facilitate and expedite handling by the operators in one radio system could be misinterpreted or ignored by another set of operators in another system. The "signal" in one system becomes "noise" in another. Use plain messages instead of codes to communicate requests such as "send an ambulance" or "send a work crew to.…"

Relaying the messages through multiple stations can cause distortions and other mishandling of the message. Minimize the amount of message handling required.

Where possible, examine the environment and see what you can do to reduce the amount of noise present at your station, which increases your ability to receive the message clearly.

These are all smart ways of making a "better communications medium."

NEVER SPECULATE

Do not speculate on anything relating to an emergency! There may be hundreds of people listening to what you say (other radio operators, media, and even the public via scanners) and any incorrect information could cause a panic.

Always get any information from *the* official source. Generally this is the person in charge, not just anyone from the served agency who happens to be at the scene. Do not take the word of bystanders or even co-workers when responding to a request for information. Getting the information from the official source may sometimes cause a brief delay, but that delay is better than passing bad information. Sometimes a person from the served agency will be designated to work with the communicator; if so, this person should be the one handling any requests for information. More often you will have to obtain the information yourself. Always go to the person in charge unless they specifically direct otherwise. At a fire scene, you would get your information from the Chief commanding the units there, not simply from the nearest firefighter. At a shelter, you would get your information from the Shelter Manager, not just one of the workers.

As an emergency communicator, your role is to pass the information, not to create or interpret the information.   Unfortunately in the real world sometimes the person with the official answer may not be immediately available and the person needing the information

may insist on an immediate answer. If your served agency absolutely insists on an estimate, and you cannot get a firm answer, you may have to provide that information. Try very hard to avoid this situation and be sure to make it very clear that it is an estimate. For example: "Estimated number of spare shovels at fire base three is twelve" could be acceptable, but the first choice is no speculation. If someone needs a count of something, try to get them the official count. Sometimes the official count may not be the same as what you see because the person responsible may have information that isn't obvious. If you are pressed into giving an estimate always make note of what was asked, by whom, and what answer you gave, then try to get confirmation or actual information from the official source.

Pass Messages Exactly as Written

Your job as a communicator is to pass traffic as quickly and accurately as possible. Therefore you will *not* change any message as you handle it.

If you note an inaccurate word count in formal traffic, you will maintain the original count and note the corrected count received at your station.

Not All Tactical Messages Will Be in standard format.

It is important that you understand that much of the tactical information being passed during an event may not be in standard format. It *will* have much of the same information, such as:
   - Name, Agency, and Title of the originator
   - Name, Agency, and Title of the recipient
   - Date, Time, and Priority of the message
   - Body of the message
but may not be in standard format.

Message Handling

Standard Formats:

The purpose of using a standard or a specified format in any endeavor is so that everyone knows what to expect. Agencies that regularly send and receive significant amounts of formal message traffic will have an established format. Some agencies and organizations don't handle that much formal message traffic and may not have an official standard format. If you regularly work specifically for an agency that has an official standard format, learn it and use it for traffic within that agency.

For traffic among agencies that do not have a format of their own, you will need to set up some sort of format. The most widely used format that is easily learned and readily recognized by almost any organization or agency is the ICS General Message Form (ICS form 213). The ICS form 213 is designed primarily for direct written communications and for originating and delivering messages. It does not include spaces for information specifically about sending and receiving the message.

Another common format is the Amateur Radio message form or "radiogram" format adopted by the ARRL as the standard for their National Traffic System. This form has special entries specifically for handling the message over the radio. Some amateurs use the radiogram format on a regular basis and many are at least somewhat familiar with it. Its use during emergency situations is very natural. While the published standard may not be perfect for all applications, it serves as a baseline that can be readily adapted for use with a specific served agency if necessary.

Some people think there is a problem choosing between the ICS 213 and the ARRL Radiogram format. There is *no reason* for this to be a problem. If the agency uses the ICS 213 and amateur radio operators want to use the Radiogram, the simple solution is to treat the entire ICS 213 *including its headings* as part of the text of the message for the Radiogram. In these instances, messages received in Radiogram format are simply written out on the ICS 213 (or other agency format) for delivery.

As an emergency communications volunteer, you will rarely be the one deciding what format to use for handling messages. You will simply use the format chosen by the agency you are serving. If the agency does not have an established format of its own, you can't go wrong using the ICS 213 format for local messages.

ICS General Message Form (ICS 213)

While some agencies have adopted slightly modified versions of the standard ICS 213, if you are familiar with the standard form, you should have no problem with any local differences.   This is the standard ICS 213:

GENERAL MESSAGE (ICS 213)

1. Incident Name (Optional):	
2. To (Name and Position):	
3. From (Name and Position):	

4. Subject:	5. Date:	6. Time

7. Message:

8. Approved by: Name: _____ Signature: |_____ Position/Title: _____

9. Reply:

10. Replied by: Name: _____ Position/Title: _____ Signature: |_____

ICS 213	Date/Time: _____

The blocks on the ICS 213 are generally self explanatory, but if there is any doubt, you can refer to the standard instructions for this form, as shown on the next page:

ICS 213
General Message

Purpose. The General Message (ICS 213) is used by the incident dispatchers to record incoming messages that cannot be orally transmitted to the intended recipients. The ICS 213 is also used by the Incident Command Post and other incident personnel to transmit messages (e.g., resource order, incident name change, other ICS coordination issues, etc.) to the Incident Communications Center for transmission via radio or telephone to the addressee. This form is used to send any message or notification to incident personnel that requires hard-copy delivery.

Preparation. The ICS 213 may be initiated by incident dispatchers and any other personnel on an incident.

Distribution. Upon completion, the ICS 213 may be delivered to the addressee and/or delivered to the Incident Communication Center for transmission.

Notes:
- The ICS 213 is a three-part form, typically using carbon paper. The sender will complete Part 1 of the form and send Parts 2 and 3 to the recipient. The recipient will complete Part 2 and return Part 3 to the sender.
- A copy of the ICS 213 should be sent to and maintained within the Documentation Unit.
- Contact information for the sender and receiver can be added for communications purposes to confirm resource orders. Refer to 213RR example (Appendix B)

Block Number	Block Title	Instructions
1	Incident Name (Optional)	Enter the name assigned to the incident. This block is optional.
2	To (Name and Position)	Enter the name and position the General Message is intended for. For all individuals, use at least the first initial and last name. For Unified Command, include agency names.
3	From (Name and Position)	Enter the name and position of the individual sending the General Message. For all individuals, use at least the first initial and last name. For Unified Command, include agency names.
4	Subject	Enter the subject of the message.
5	Date	Enter the date (month/day/year) of the message.
6	Time	Enter the time (using the 24-hour clock) of the message.
7	Message	Enter the content of the message. Try to be as concise as possible.
8	Approved by • Name • Signature • Position/Title	Enter the name, signature, and ICS position/title of the person approving the message.
9	Reply	The intended recipient will enter a reply to the message and return it to the originator.
10	Replied by • Name • Position/Title • Signature • Date/Time	Enter the name, ICS position/title, and signature of the person replying to the message. Enter date (month/day/year) and time prepared (24-hour clock).

The ARRL Radiogram format:

The primary purpose of a standardized format is so persons can send and receive formal messages briefly, with the minimum amount of explanation. The ARRL Radiogram is a specific format that Amateur Radio Operators use for handling formal message traffic. This allows for the administrative handling of messages without having to go into lengthy discussions about where the traffic originated or how important it might be and where it's going.

The "Radiogram" format was developed by the ARRL National Traffic System as a format optimized for relaying message traffic across the country using amateur radio nets.   It includes fields such as the "check" to help ensure the accuracy of the message as well as fields to record the amateur radio stations sending and receiving the message. The current version of this form looks like this:

The Amateur Message Form Is Broken into Four Parts:

• The **preamble**, often referred to as "the header." This includes administrative data such as the message number, originating station, precedence, and date/time of origination. The combination of the message number and the originating station serves as a unique message identifier, which can be traced if necessary. This information is normally all provided by the radio operator at the point the message is originated, not by the author of the message itself.

- The **address**. For messages leaving the local area this includes name, street address or P.O. box, city, state or province, and postal code of the individual to whom the message is intended to be delivered. The address should also include the area code and telephone number since the majority of messages leaving the local area are ultimately delivered via local phone call in the destination area. For message traffic within a local area, the name or title of the individual and the specific agency may be sufficient.

- The **text** of the message. The text should be brief and to the point; limited if possible to 25 words or less. Care should be taken to avoid contractions. This is especially important for messages that may be transmitted by Amateur Radio traffic nets because the apostrophe is generally not used in CW. Contractions are easier to misunderstand and may create errors in the word count. Also if "cannot" appears in a message to be originated at your station, it should be written, counted, and sent as two words: "can not."

- The **signature**. This can be a single name, a name and call sign, Mom and Dad, a name and a title – whatever is needed to ensure the recipient can identify the sender. The amateur originating a message should have enough information so that a reply message can be returned to the originator.

The Signature -- Why It Is Important

During an emergency the messages you handle can easily contain requests for very expensive supplies that have a very limited "shelf life" (such as blood for an aid station) or for services that will only respond to authorized requests (flight for life helicopters). As such it is imperative that you insure the signature/authority is included in every message.

ARRL Radiograms

There are very specific instructions for every block in the ARRL Radiogram format as well as for how such messages are sent and processed. Those instructions are too detailed to cover here. If you are working for an agency that uses the ARRL Radiogram format refer to the ARRL traffic handling manuals available on their website at arrl.org for detailed information.

While the Radiogram and the ICS 213 look quite different, a closer examination of the formats shows that although very different in appearance they can be compatible.

The areas highlighted here in yellow are completed by the amateur radio operator sending the message.

The areas highlighted in pink are completed by the amateur radio operator receiving the message. These areas are only used for sending and receiving the message over amateur radio. None of this information comes from or goes on the ICS 213

The area highlighted in green is identical to block 2 of the ICS 213.

ALL the remaining information from the ICS 213 goes in the text of the message (the area highlighted in blue.

Transcribing the ICS 213 into the text of a Radiogram might seem complicated when looking at the picture of an ICS 213 form, but it becomes much more obvious when you look at the "text" version of the ICS 213 which is the format used for sending an ICS 213 via email, teletype, packet radio or similar modes. This is the text version of a standard ICS 213:

```
GENERAL MESSAGE (ICS 213)
1. Incident Name (Optional):
2. To (Name and Position):
3. From (Name and Position):
4. Subject:
5. Date:
6. Time
7. Message:
8. Approved by:  Name:  Signature:  Position/Title:
9. Reply:
10. Replied by:  Name:  Position/Title:  Signature:
ICS 213
Date/Time:
```

Prowords

When sending formal traffic, certain Procedure Words (prowords) are used to clarify portions of the message. The standard prowords are:

BREAK
  Separates address from text and text from signature.

CORRECTION
  I'm going to correct an error.

END
  End of message.

MORE
  More messages to follow.

NO MORE
  No more messages to follow.

FIGURES
  Used for a word group consisting of all numbers.

INITIAL
  Used only for a single initial.

I SAY AGAIN
  Used to indicate a 'repeat' of a word.

I SPELL
  To spell [phonetically] a word.

LETTER GROUP
  Examples: ARES, SCTN

MIXED GROUP
  Examples: 12BA6, NNNØSBK

When receiving formal traffic, certain prowords are used to ask for clarification or repeats of missing words. These prowords, which should be preceded by the proword SAY AGAIN, are:

  WORD AFTER
  WORD BEFORE
  BETWEEN
  ALL AFTER
  ALL BEFORE

ARRL Numbered Radiograms

The ARRL has adopted a standardized list of often used phrases in NTS messages. Each phrase on the list is assigned a number.

During any emergency communications assignment, never originate a message using ARRL Numbered Radiograms because there is too much chance that they will be misunderstood. Always use Plain Language.

There are two groups: group one for emergency relief consists of 26 phrases numbered consecutively from one to twenty-six. As an example, number six means: "Will contact you as soon as possible."

Group two, for routine messages, consists of 21 phrases numbered forty-six and then consecutively from fifty through sixty-nine. A complete list is included in Appendix B of this manual and is available in ARRL publication FSD-3.

When using numbered radiograms, the letters ARL (ALPHA ROMEO LIMA) are placed in the Check block of the preamble, just prior to the number indicating the word count. In the text of the message, the appropriate numbered radiogram is inserted by using the letters ARL (ALPHA ROMEO LIMA) as one word, followed by the number written out in text - not numerals. For example: "ARL FIFTY SIX." When using voice it is important to spell out the numbers. This allows the receiving station to correctly copy what is being sent and *not* inadvertently write the figures 5 6. "ARL F-i-f-t-y S-i-x" is counted as *three* words. Some common mistakes are for the receiving station to write ARL dash five six and count it as one word; or ARL space five six and count it as two words.

Other examples:

- ARL SIXTY TWO: Greetings and best wishes to you for a pleasant [————] holiday season.

- ARL SIXTY FOUR: Arrived safely at [————]

As these examples show, there are some numbered radiograms which require a "fill in the blank" word or two in order to make sense!

One special consideration in the use of ARRL Numbered Radiograms is that the message must always be translated to plain text before delivery (unless the addressee is an Amateur Radio operator and you are absolutely certain he or she knows the text of the numbered radiograms).

Translating numbered radiograms to plain text is also the proper practice any time the message is being passed outside Amateur Radio – including messages transferred from the NTS to MARS!

Personal Safety Considerations

Yourself

Each of us has heard the saying, "Watch out for number one, because no one else will." Whether in a training exercise or an actual emergency your safety is up to you. It is your primary concern and responsibility.

If at any time you are asked to perform an assignment that, for any reason, you are uncomfortable with, decline it. If your concern is with safety, please let your group leader know why you declined.

Your Team

Your second priority is the safety of your team. This is not just your *REACT* Team, but the entire team working the emergency, especially anyone working with or for you. There can easily be assignments where a person will be busy or engrossed with their specific task and may not notice unsafe conditions. You as the second person there will need to be very careful about the safety of your team.

Your Mission

Your mission becomes important only after your safety and the safety of your team. During that mission, if the safety of anyone becomes an issue, speak up, and if necessary leave.

The standing rule in fires and other hazardous situations is to always have *two* exits and should one of them become unavailable, *immediately* use the one you still have. If necessary leave your equipment. Equipment can be replaced, people can't.

Workers Compensation Insurance

During the briefing for the event you are about to go out on there should be mention about workers compensation insurance. If it is not mentioned, ask!

Not every served agency will be able provide you with workers compensation insurance. If yours does not, feel free to decline the assignment if the lack of insurance bothers you. If you are willing to participate without workers compensation insurance, that is fine, but you must know in advance of going out, so you can make an informed decision.

Often state law will regulate which agency or agencies handle such coverage. In many jurisdictions, volunteers have to be *registered* with the agency before they will be covered. Such registration may be possible at the time of an emergency, but it is certainly easier to do it in advance. *REACT* Team leaders should consider this a vital point to cover during their advance planning with any served agency.

Modes of Communications

REACT is a "multi-mode – multi-service" communications organization. But, of course, each individual member will not be licensed or equipped for every possible mode and service. Each Team utilizes those modes and services for which they have licensed, trained operators and appropriate equipment.

Voice (FM, AM, & SSB)

Voice or "Phone" communications is the primary method utilized by REACT Teams. It is also the primary mode of communications used by virtually every agency and organization involved in emergency communications.

- **FM** (Frequency Modulation) can produce a high signal-to-noise ratio with a signal of moderate strength, and is very useful for mobile communications. It requires wide bandwidth, and does not always propagate well. FM is typically used on VHF and UHF. It is also used in parts of the 10-meter amateur band.

- **AM** (Amplitude Modulation) is the most basic form of voice radio modulation. It is used in broadcast radio, CB, and general aviation radio.

- **SSB** (Single Side Band) is a suppressed carrier Amplitude Modulated (AM) signal with one side band removed. This mode is more efficient than AM as the same information is packed into less bandwidth and uses less power. It is affected by ionization of the atmosphere, producing signal propagation across long distances under the right conditions. It is a noisy mode, though, with plenty of static and often a low signal-to-noise ratio if the signal is weak. There are two parts, Lower Side Band (LSB), and Upper Side Band (USB). SSB has very limited use among government agencies and the military. It is commonly used on some CB channels and for most Amateur Radio HF voice ("phone") operation. On Amateur Radio frequencies LSB is typically used below 9 MHz; USB is used above 9 MHz. This convention is widely practiced, and originates with the way SSB equipment was first built and used in the 1950's. The exception to the "9 MHz rule" is HF Packet that uses LSB above 9 MHz. SSB is authorized on parts of all amateur bands, but is generally only found on HF, with some use on 2 meters for long distance (DX).

CW (Continuous Wave) - Morse Code

CW is the most basic radio communications mode, operating as a single tone turned on and off in dots and dashes. A dash is three times as long as a dot. CW can be used under almost any condition and is known among Amateur Radio operators throughout the world. The equipment is simple. CW requires training and dedication for high speed traffic. Five words per minute is fairly simple to learn, but retention is poor without consistent use. Higher speeds require more training. CW has been just about abandoned by everyone outside Amateur Radio and since the requirement for Morse Code was eliminated by the FCC, most newly licensed Amateur Radio Operators in the US have no experience with CW.

Digital Modes (Packet, RTTY, AMTOR, PACTOR, PSK31, etc.)

Digital modes require connecting a computer (or specialized hardware) to a radio and sending data by various protocols. Digital modes are not authorized in all radio services, most use of digital modes for emergency communications would be in Amateur Radio.

Simple text is the common format for digital modes. This allows long text files to be sent and received without speaking. For example, supply requests or lists of shelter residents can be sent without tying up a voice channel. The text can be sent by typing directly to the computer, or uploading a file. This is obviously very useful for some types of emergency communications.

The connection to the radio can be direct from a computer or by using an interface (known as a terminal node controller, or TNC) depending on the hardware available. Some TNC models have a mailbox capability for some modes, which allows messages to be left without both operators being present. The computer software used for digital modes also often includes this function.

All digital protocols use binary code to send and receive data. Each protocol differs in the method used to send/receive data. This determines the number of characters available, data rate (baud), and the error recovery method. These are robust, but the data transfer rate can and will be reduced considerably under bad band conditions. Error correction means the stations confirm that the text was received properly by "Automated Repeat Query" (ARQ). If conditions are bad, the stations can become stuck, repeatedly re-sending parts of the traffic. ARQ is used between a sending station and a single receiving station at a time. Multiple stations can receive under some conditions, but this requires that ARQ not be used. A "broadcast" mode known as "Forward Error Correction" (FEC) reduces the error rate by sending everything twice.

Using digital methods has a modest equipment requirement, but is not as simple as a basic voice station. The training and expertise required is somewhat higher than a "talker," but below that of CW. Typically, a digital station requires a power supply, a computer or terminal, a TNC, and a radio.

- Radio teletype or RTTY (sometimes called BAUDOT). This is the original digital protocol (although some would argue that CW is digital), developed before World War II. It is very common, quite simple, good at beating bad band conditions, and is a popular contesting protocol. RTTY has a limited range of text characters (mostly capitals and numbers), and has no error correcting methods, either ARQ or FEC. It is simple enough to slip through much band noise. RTTY is strictly for HF bands.

- Amateur Teletype Over Radio (AMTOR). This is an enhanced version of RTTY, with ARQ and FEC. It has a small character list (slightly larger than RTTY), and is quite robust. AMTOR is strictly for HF bands.

- Packet is based on the original Internet protocol, named X.25. The packet protocol is known as AX.25 (where the A stands for Amateur). All text characters found on a keyboard (excluding ALT and CTRL keys) can be sent by packet. It is designed for ARQ contacts, but can broadcast in "CQ" mode. Packet can be used on HF and VHF, but is more suitable at VHF (where a higher baud rate of 1200 or 9600 can be

achieved). Higher frequencies produce even higher rates (up to 56 kilobaud). Packet is designed for computer interface, and can be networked (see below).

- Packet Teletype Over Radio (PACTOR). This is a combination of packet and AMTOR. It is designed for HF use only, and has the best features of both. PACTOR is more robust than AMTOR or RTTY, but can be slowed by bad band conditions.

- Phase Shift Keying 31 baud (PSK31) is a new mode, and has a lot of promise. In terms of protocol and operation, PSK31 is similar to RTTY. All the above digital modes use "audio frequency shift keying" (AFSK), phase shift keying defeats much of the band noise and uses very little bandwidth. Low power signals have been sent long distances.

- There are a vast array of other digital modes and many variations among them. Other available digital modes include variations of MT63, Olivia, and many more. Digital modes can be very useful for emergency communications but such use requires advance planning because each station needs to be equipped and configured to use exactly the same mode.

An interesting thing about digital modes is the speed. Only on certain bands and with the right equipment will data speed ever exceed 1200 baud. On HF bands, the rate is typically 300 baud or less; often considerably less, especially on RTTY. Packet on VHF is normally 1200 baud. Compare that with Internet speeds of measured in Megabytes per second! The advantage is that the connection is simple, and does not rely on an elaborate fixed infrastructure (e.g., phone systems). Because most people cannot type as fast as the baud rate, this speed is not a problem for live communications.

Typically, any terminal software on a computer can be used to access a TNC and operate a digital mode. There are custom software packages for any given TNC, but they are often not necessary. Some digital modes (e.g., PSK31) use computer sound cards. Other modes can be emulated on a computer, without having a separate TNC.

Automatic Position Reporting System (APRS)

APRS uses a Global Positioning System (GPS) connected to a radio to send a digital message containing the location (latitude and longitude). APRS uses a specific application of the Packet radio protocol to send the location, callsign, and short text message. This specialized mode is used when the location is the primary information to be communicated.

The APRS station can generally be set to transmit at regular intervals, or keyed to a voice transmission (i.e., sent immediately after the mike is unkeyed). The packet burst is received by stations operating on the same frequency or may be relayed from a voice repeater to the local APRS frequency.

Receiving stations translate the packet burst into a location on a map. Special programs display the location, call, and text message of the sender. A nationwide APRS net relays those signals by HF radio and Internet relay.

Until recently APRS has been primarily a mobile mode (e.g., in a car). New equipment recently coming on the market makes it possible to have a completely portable APRS transmitting station consisting of just a handheld radio with built-in GPS receiver.

Making effective use of APRS data still requires some hardware and software to plot and display the locations reported (usually a computer displaying the locations on a map). The principal value is following the location of a person or vehicle without the need for voice transmissions.

Packet E-mail Systems

There are several methods for sending messages using Internet-like e-mail via radio. One highly effective method is called JNOS. JNOS is a Network Operating System (NOS) that can be used as a platform for exchanging messages using a wide range of methods such as the Internet and amateur radio.

Strengths of packet e-mail systems:

- Hardcopy messages provide accuracy when dealing with long or complicated information.

- Hardcopy messages are instantly available to be photocopied and handed out.

- For long messages, packet messages can be sent and received faster than voice messages.

- Messages can be received, forwarded, and printed automatically without the need for operators.

- It has very good signal detection at 1200 baud when compared to FM voice. A TNC2 will pull out a full copy digital signal when it is barely audible on voice.

  - When engineered correctly, a packet network has a high level of service.

Weaknesses:

- Requires computers and continuous power to operate.

- Requires computer literate people to install and configure the equipment.

- Requires packet literate people to install and configure the equipment.

- Requires all participating systems to use the same software and methods.

- The communications channel can get congested if other stations randomly enter the network, resulting in a poor quality of service.

- Messages that need to be rerouted to another network are not automatically detected and rerouted as would be done by operators in a voice network

Visual Fast-Scan TV and Slow-Scan TV

Fast-scan TV (FSTV), also referred to as amateur television (ATV), uses a transmission format fully compatible with video equipment designed for the home consumer market. The video is amplitude modulated and the audio is frequency modulated. Simply stated, the ATV picture display has full motion with simultaneous sound, can be in full color, and has excellent detail. Because the signals occupy several megahertz of bandwidth, the FCC does not permit ATV on bands below 420 MHz. with most activity being between 420 and 440 MHz.

Slow-scan TV (SSTV) uses a special format to send TV-like images one frame at a time. The effect is a still picture or a slide show rather than a moving picture. SSTV requires much less bandwidth than FSTV so the SSTV can be transmitted on bands where FSTV is not authorized. SSTV can generally be transmitted over any sort of connection (such as telephone) that can support voice traffic..

Security and Privacy Considerations

Who Is To Receive the Message?

The message is for the intended recipient and the communications should remain private. When handling the message, you should not reveal the existence or contents of the message, even after the operation. Let the receiving agency determine if they want to acknowledge the message, and let their Public Information Officer (PIO) inform the media of the content.

Who Is Listening?

You do not know who is listening. It could be the general public. It could be the media. During a hectic operation, it is unlikely they could monitor and track the full range of messages in transit. Because they are willing to pick up on one message out of context and expand on it, rather than having the full benefit of all the information at the Emergency Operations Centers, distortions and misrepresentations could result by third parties.

Do not speculate, and stick to passing messages originated and signed (authorized) by a responsible sender. Log all messages, including the date/time of origin in case there is a need to verify the origin and timing of the message.

As liability lawsuits have become quite common following disasters and emergencies, the detailed documentation of message traffic has become ever more important. The dreaded legal questions of "What did he know?" and "When did he know it?" may well be decided based on the message logs of an individual emergency communications volunteer radio operator.

What You Don't Say

To the extent possible, do not pass along codes or account numbers over the air that are considered unlisted or private. Examples are unlisted phone numbers, credit card numbers, control codes for repeaters. If such codes or numbers are needed to fulfill an action, see if the message can be routed without the codes to a third person who has both the codes and regular (telephone) communications and who can act on behalf of the affected party to complete the action (i.e., send the message to a relative who also has the unlisted telephone numbers to complete the calls) .

If the situation becomes tense, especially due to priorities vying for limited availability, be careful of the language passed on the air. The safest method is to replace language with high emotional content with language consistent with what diplomats use. ("We are very disappointed that the requested engineer and doctor will be displaced on the first flight out by the persons from administration support. We request you reconsider in light of the new developments in the last half hour and reinstate the engineer and doctor.") Remember, you can *suggest* more tactful language, but unless you are the originator you have to send the message as the originator actually wrote it.

Be sensitive during times when fatalities may occur. If the operation involves the possibility of finding the remains of dead people, do not refer to the need for additional resource people as "Need additional help. Send over more bodies."

Use headphones when operating to avoid having others nearby casually listen in.

Enhancing Security and Privacy

If you need to enhance security or privacy, consider these techniques.

- Use digital (non-voice) modes to enhance privacy/security. Modes such as CW, packet, AMTOR, PSK31, RTTY are possibilities.
- Use modes not frequently found in scanners or consumer radios, such as SSB and CW for HF and 6m, FM for 10m, SSB and CW for VHF/UHF/1.2G.
- Use satellite systems (with directional, non-terrestrial, low power signals) to work around casual terrestrial listeners.
- Use image modes such as ATV, SSTV and FAX to pass images.
- Use horizontal polarization to reduce vertically polarized signal strength.
- Use split-frequency, cross-band, or cross-mode operations to force the monitoring party to use two separate receivers.

Do not reveal the existence of the communications even after completion of the incident.

Do not speculate about the messages. Do not attempt to expand upon messages beyond the text of what has been exchanged.

Do not pass codes or numbers on the air that are considered unlisted or private.

Observe the use and content of the language used.

Use tactical callsigns not indicating sensitive locations (i.e., "Station Alpha" instead of "ICS Command").

Operating Stress

Emergency communications is a very challenging assignment. There is a lot of need being placed on people in a short amount of time. For this reason, stress can build upon the operators. As these demands wear down the individual's capacity for tolerance, flexibility, and creativity, the person shows signs of stress. People show it as varying levels of irritability and emotional outbursts, which affect the interpersonal relationship present.

The best time to deal with stress is to learn coping mechanisms *before* responding to an event. It includes:

- Focusing on teamwork, strategy, and results, and not on idle worry and concern – which does nothing to help the situation.

- Learning tolerance and patience during times of heightened demand and activity.

- Learning that we are human and there are limits to our performance, both individually and corporately.

- Learning the impact that diet, beverages, and exercise can have on relieving stress and increasing the capacity for coping.

- Learning to get rest and take breaks.

In the intensity of the situation, a person may be exposed to new life experiences. A healthy person is able to withstand the emotional experience enough until the impact of the onset passes, then begin processing the experience and begin to accept the situation. The members of the team should learn skills to improve the level of emotional maturity before engaging in stressful activity.

Active Listening Skills

There are a number of simple, practical skills that can be learned and used in any interpersonal situation. One of the most valuable ones is "active listening." With active listening, you will be able to increase your listening ability as you gain the receptiveness of the other person. By building bridges through effective listening skills, you can prevent situations from escalating unnecessarily.

One of the barriers to effective communications is leaving the other person with the feeling that you did not correctly understand his/her situation and message. There are a number of ways this can occur unintentionally:

- The person's rate of talking is quick, and you speak slowly, or vice versa.

- The person's tone of voice does not match yours.

- The person is trying to communicate a point, you have not acknowledged it, and you're trying to communicate another point.

Active listening skills can be used to break through a stalemate. It is composed of:

- Giving the other person your full, undivided attention.

- Listening carefully to what the person is saying.

- Repeating back and paraphrasing to the person what you heard him/her say, in effect acknowledging that you received the point.

You can acknowledge the person's feelings, or the content that the person is saying, by using phrases such as:

- "It must have been frustrating to have been there."

- "The heat must have been exhausting while trying to operate and maintain contact."

- "Let me see if I understand... You're saying..."

- "So you're saying that you believe ..."

- "If you're correct, then you think that..."

If the person perceives you understand his/her feelings and the message, he/she will feel more comfortable with the situation and establish a better rapport.

"Pace, Then Lead" Skills

If you're successful in establishing good rapport and you wish to direct a conversation constructively, you can use the "pace, then lead" method to guide discussions to productive outcomes. The concept is to "come alongside" the other person, establish a rapport, then when the understanding is solid begin to lead the person in discussion toward productive outcomes.

First, establish a good bridge using the active listening method above. This enables you to "come alongside" the other person.

Next, establish a solid rapport by understanding the point (or points) the other person is relating. The other person may also be venting, so just keep listening and allow the person to vent away the frustration and emotion.

When the emotional content has been diffused, slowly introduce the topic you wish to discuss. Begin slowly, and have the other person become open to other observations or ideas. One of the better ways is by using the "Feel, Felt, Found" method. You can use it to overcome objections to a given situation. The conversational sequence is:

- I've heard others feel that ... (express to the other person that you understand how they feel and what's on their mind)

- Some others also felt that ... (express that other people felt that way too. This helps him/her to feel comfortable that others feel the same way.)

- They looked into it and found that ... (this gives you a chance to relate what others found, and how it changed their minds).

The "feel, felt, found" technique establishes a common starting point, rooted in an emotion-based belief about the topic. It then introduces the concept of a search and gives you an opportunity to relate the outcome of that search effort. The other person can still question the validity of the outcome, but at least you had a meaningful way to present the observation or idea. *

Steps for leaders to consider before the incident – Steps are needed to anticipate oncoming stress and mitigate the results after the onset. Some steps for leaders include:

- Inform the emergency communicators that tensions can form, so don't take anything personally.

- Tell people up-front that we're all in this together, and remind the people present of the objective. (Since the objective changes from event to event, there is no one single answer. It could be riding out the event, getting out of danger's way, stabilizing and transporting victims to an area hospital, etc.)

- Establish teamwork and cooperation. Remind everyone that working together will achieve the most results. We have to make do with what we have.

- Inform everyone of who is in charge.

- Look ahead to secure the essentials for the comfort of those present, such as food, water, sanitation, chairs and mats. Find out what is available to meet the needs of parents with small children if they are present in the scene. Secure a broadcast radio so that those present can monitor progress as reported by the media.

- Inform the emergency communicators to check with the person designated to process them before releasing them from the assignment. This gives the opportunity for someone to assess the condition of each communicator prior to their returning home and see if they need follow-up attention.

- Activate and bring in stress management personnel.

If the operator is assigned to a location that is out of touch, the operator's family may be increasingly concerned as time passes. Make an effort to get a message to the family letting them know where the operator is located, that he/she is doing fine, the value that the person is contributing to the effort, and when the assignment may be completed. This consideration shown to the family will make it easier for the operator to participate during the next event.

When You Live in a Disaster Area

Living in an area that experiences a disaster can be emotionally devastating. People see a lifetime of effort destroyed in a matter of hours or minutes. One needs to go through a period of grieving and a time of healing before becoming productive. Relief workers and communicators may need to help counsel those affected by the disaster. To help with the grieving process, allow the affected person to express emotion and memories while being an active listener.

* Additional information on this topic can be found in the audiotape and videocassette series, *How To Deal with Difficult People*, by Rick Brinkman and Rick Kirschner (Boulder, Colo.: CareerTrack, Inc., 1997).

Dealing with Stress as an Emergency Responder

A responder to an emergency may be expected to stabilize the situation while the main body of rescue and relief workers are mobilized. Often the first responders have to work with little in the way of people, equipment, and supplies.

There are times when the first people on a scene are exposed to experiences that can be overwhelming. At such times, leaders must be prepared to relieve the operator and allow him/her to meet with stress management and post-trauma personnel.

Most emergency management agencies and many emergency response organizations have programs called Critical Incident Stress Debriefing (CISD). Participation in such programs may be mandatory or voluntary. Many people resist participating in these programs the first time, but almost everyone who has ever participated in one acknowledges its value. If your agency has such a program, participate. If the agency doesn't have a program, encourage them to start one or to find a way to share in the program of another agency or organization.

When Not To Say Anything

When a person is overcome with emotion, the best thing to do may be to let the person process the emotions and not say too much that would disrupt them. Depending on the person's needs, they may want company during the time of difficulty and assurance that they won't have to face the difficulty alone.

To help with the grieving and coping process, allow the affected person to express emotion and memories while being an active listener.

Sometimes it might be appropriate to contact a relative or friend to take over the task of maintaining emotional contact.

Debriefing

Assign someone to check on the operators as they check out before they leave an assignment. This gives your team an opportunity to receive any field reports from the operator, to assess the operator's condition prior to releasing them to return home, and to thank them for turning out.

On major incidents there will almost always be a formal demobilization process. This process generally applies to every individual who was deployed at any time during the incident. Whenever you respond to an incident, be sure that you know and follow the complete demobilization process.

The Four C's of Emergency Communications

The best advice for any emergency communicator can be summarized by the four C's: Calm, Courteous, Correct, and Concise.

Calm

Try to keep emotion out of your voice. No matter what the emergency, a calm, professional attitude will help keep things cool and get the message through more quickly and accurately. Losing your cool, calm attitude may cost you an important message. The more reason for getting excited, the more important it is for you to remain calm. As a *REACT* member you should set a good, calm example for the other party to follow.

Courteous

You must think of yourself as a public servant. Regardless of provocation, remain courteous at all times. Never display temper on the air. Remember the "Golden Rule" at all times and practice it. Never fight with other operators over handling calls. During a net, follow the instructions of the Net Control Station. Outside a net, the simple rule of common sense is that the station with the best communications handles the call. If some problem needs to be ironed out, do it by telephone, not over the radio.

Correct

Work to keep errors out of your communications. Use the phonetic alphabet and repeat the message where appropriate to get names, locations, and other information accurately. Write everything down for reference. A small inexpensive voice recorder is a handy tool at your station, but the information on the recording will be no better than what you originally got over the air. Report emergencies to the correct authorities. If you live near any jurisdiction boundaries, become familiar with them. Keep a local street map with the boundaries marked. When giving road directions refer to your street maps and confirm addresses whenever needed. It is always better to admit you don't know rather than give out information that is wrong. Unless specifically required by a served agency, always use plain language not Q-signals, 10-codes, etc. Correct communications includes following the FCC regulations.

Concise

Your job as an emergency communications operator is to get the message and provide assistance to the agency you are serving. Avoid tying up the frequency by keeping your transmissions as brief as possible. If prolonged communications appear to be necessary consider moving to another frequency. Always leave a few seconds between transmissions in case someone needs to break in with another emergency call. A strictly business attitude is your best technique for assuring time-saving communications.

Served Agency Communications Systems

Most agencies we will work with have their own communications systems. Our role is generally to help meet a shortfall caused by surge requirements during an emergency. The most common such requirement involves communicating between different agencies, but in some cases there may also be a need for additional operators for the agency's own communications systems, especially for agencies that do not normally operate their system on a 24 hour basis.

Overview of Served Agency Systems

Each served agency will have its own unique communications system. It is in the best interests of both served agencies and the *REACT* Team to discuss and understand what systems your local served agency uses. While you discuss the communications they use, ask what, if any, requirements they may have for additional radio operators to operate the served agency system and what unique knowledge these operators will need.

Trunked Systems

Trunked systems use computer control to switch any given conversation from frequency to frequency (within a set limit). This has the advantage of seeming to be the only communications going on at that time (no doubles). This is accomplished by having a computer controller move the conversation from frequency to frequency in accordance with a pre-established algorithm. Amateur Radio does not generally use this type of system, but many government agencies (especially in larger metropolitan areas) have moved to trunked systems in the last few years.

Digital Systems

Many government agencies have moved to various digital radio systems. Digital systems are easier to encrypt and are more difficult for the public to monitor with scanners even when not encrypted. When properly designed and installed, a digital system will often be more reliable than a conventional analog system within its intended coverage area. Digital radio systems provide a degree of error correction that helps to ensure clear voice communications. Unlike analog systems which tend to become noisy in weak or fringe areas, digital radio systems are generally all-or-nothing. There is generally no weak area where voice signals are noisy, instead any signal strong enough to be decoded will be completely clear, but any signal that is too weak to be decoded correctly will fail completely. Thus as a user moves out of range there is no warning that the signal is becoming weak - the radio just suddenly stops communicating. There are several different kinds of digital systems being used by various government agencies. While all these systems are very similar in features and operation, generally they are not compatible with other systems. The most common digital radio standard among government agencies in North America is usually called "P25" which is short for APCO Project 25. In Europe the TETRA system is nearly universal among government agencies. Many systems are known by the manufacturer's trademark name, such as "MotoTrbo" by Motorola rather than the generic name for the standard being used.

Subaudible Tones

Subaudible tones are used to minimize interference caused by multiple users on a single channel. The technical term is Continuous Tone Coded Squelch System (CTCSS) but it is often called "PL" (for the Motorola trademark name "Private Line"). It requires the transmitting station to have a specific tone (in the range of 67 to 250.3 Hz) with a deviation (on FM) of approximately 750 Hz. The receiver hearing this tone opens the squelch to allow communications. This system does *not* eliminate or prevent interference nor does it create any real privacy. What the system does is to enable the receive to *ignore* signals that do not have the matching tone. Thus several users can use the same channel without having to hear each other's messages, but if two users attempt to transmit at the same time it still creates the same sort of interference that would occur any time two stations try to transmit on the same frequency at the same time. CTCSS is also used to control access to some amateur and most commercial repeater systems. In this role it generally prevents unintended signals from keying the repeater.

Tone Encode and **Tone Decode** are terms describing two ways CTCSS systems operate.

- Tone Encode (also called Transmit Tone or TX Tone) is a transmitter function that sends the subaudible tone every time the radio is keyed. Tone Encode is necessary to access repeaters using tone and is necessary to communicate with other radios that are using Tone Decode. Tone Encode can be used by itself for these purposes. When a radio is set up to use *only* Tone Encode, that radio will receive any signals on the frequency regardless of whether or not those signals have the matching tone. Tone Encode is generally the preferable setting to use during emergency communications.

- Tone Decode (also called Receive Tone or RX Tone) is a receiver function that prevents the radio from receiving any signal that does not have the matching tone. Tone Decode would not be used without also using Tone Encode. Any radio equipped with Tone Decode should also be equipped with some easy method to temporarily disable the decoder so the operator can check the frequency before transmitting. A few radios omit this necessary control function. Even on radios properly equipped with the "monitor" function, often operators simply are not aware of it. Operators using Tone Decode on shared frequencies must be trained to *always* check the frequency before transmitting.

Digital Coded Squelch (DCS)

DCS is also sometimes called "DPL" (the Motorola trademark "Digital Private Line"), "DCG" (the GE trademark "Digital Channel Guard"), or CDCSS (Continuous Digital-Coded Squelch System). For the operator, DCS operates the same as CTCSS tones but it uses digital encoding instead of subaudible tones.

Telephone and Satellite Systems

Many agencies have specialized internal telephone systems. Some agencies also have satellite communications systems. All these systems in use by Public Service agencies vary greatly. Please contact your local agency to determine their unique requirements.

August 2017